Unit A Chemical Change

When was the last time you spent a warm, summer day at the lake? Being active for many hours in and around the water can leave you feeling mellow, with a warm glow on your face from a full day of wind and sun. Have you ever taken time to sit by the water at twilight and enjoy the hush of breezes and the blush of the evening sky? In moments like these, it is common to feel a strong connection to the environment.

In a day at a lake, you may have used modern products, like boats, life jackets, snorkels, fishing gear, and a barbecue. Are these items connected to the natural world too? How does the boat in the photograph connect to the rocks, trees, water, and sky? The answers have to do with the fact that all consumer products come from natural resources obtained from Earth. In each case, natural resources—such as fresh water from lakes and streams, metal ores from deep mines, and petroleum from underground reserves—are transformed into raw materials and, then, manufactured into products. Most of these transformations involve chemical processes.

In this unit you will investigate chemistry from the point of view of producing consumer goods. These investigations will help you develop an understanding of the nature of matter and chemical change. Throughout this learning, you will be encouraged to consider the balance between the needs of humans to create products from natural resources and the need to maintain a sustainable environment.

Teach your children what we have taught our children; that the Earth is our mother. Whatever befalls the Earth befalls the sons of the Earth . . . We are part of the Earth and it is part of us. This we know. The Earth does not belong to us. We belong to the Earth.

— Chief Seattle

What You Will Cover

Chapter 1: Aqueous Solutions

1.1 The Structure of Matter
1.2 Atomic Bonding and Properties
1.3 Breaking Bonds
1.4 Solutions and Concentrations
1.5 Calculating Concentration

Chapter 2: The Reduction and Oxidation of Metals

2.1 Compounds and Chemical Change
2.2 The Gain and Loss of Electrons
2.3 The Reactivity of Metals
2.4 Using Voltaic Cells
2.5 The Electrolytic Cell

Chapter 3: Organic Chemistry

3.1 Carbon Chains
3.2 Saturated and Unsaturated Hydrocarbons
3.3 Petroleum Is the Source
3.4 Everyday Use of Hydrocarbons